ISSN (print) 0093-4666 © 2011. Mycotaxon, Ltd. ISSN (online) 2154-8889

MYCOTAXON

http://dx.doi.org/10.5248/117.269

Volume 117, pp. 269–278 *July–September 2011*

Four anamorphic fungi (with two new species) from forests of Western Ghats, India

J. Pratibha[1A], D.J. Bhat [2] & S. Raghukumar[1B]

[1]*Myko Tech Pvt. Ltd., Plot no. 12, Mapusa Industrial Estate, Mapusa Goa – 403507, India*
[2]*Department of Botany, Goa University, Goa – 403 206, India.*

Correspondence to: [1A]*jalmipratibha@rediffmail.com,* [2]*bhatdj@rediffmail.com,* [1B]*s_raghukumar@mykotech.com,*

Abstract — *Anaselenosporella indica* and *Arachnophora goanensis*, two new species of anamorphic fungi isolated from decaying plant litter collected from the forest of Goa, India, are described and illustrated. *Anaselenosporella indica,* found growing on dead twig of an unidentified plant, is characterized by polyblastic, sympodial, discrete, conidiogenous cells and cylindrical, rarely curved, aseptate, hyaline conidia. *Arachnophora goanensis*, collected from dry decaying bark of an unidentified tree, is characterized by blastic pigmented stauroconidia and blastic hyaline fusiform synanamorphic conidia. Two other species from the monotypic genera *Catenosynnema* and *Cheiromyceopsis* are also reported for the first time from India.

Key words — biodiversity, taxonomy

During research on microfungi from forests of Western Ghats in Goa, four interesting fungi belonging to the anamorphic genera *Anaselenosporella* Heredia et al., *Arachnophora* Hennebert, *Catenosynnema* Kodsueb et al. and *Cheiromyceopsis* Mercado & J. Mena were isolated from fallen and decaying plant litter. Two are described and illustrated as new species, *Anaselenosporella indica* and *Arachnophora goanensis*. Collections of new species are conserved in the herbarium of Indian Agricultural Research Institute, New Delhi (HCIO) and new records at Department of Botany, Goa University, Goa.

Anaselenosporella indica Pratibha, Bhat & Raghuk. **sp. nov.** Figs 1, 2

MycoBank MB561104

Ad fungus anamorphicus. Conidiophora macronemata, mononemata, singula, erecta, laevia, recta vel leviter flexuosa, ramosa ad apicum, atrobrunnea ad basim, pallid brunnea ad apicum, multiseptata, 85–140 × 4.5–8 µm. Cellulae conidiogenae polyblasticae, lageniformes, leviter geniculatus et elongatus versus apicum, 15–30 × 2–4

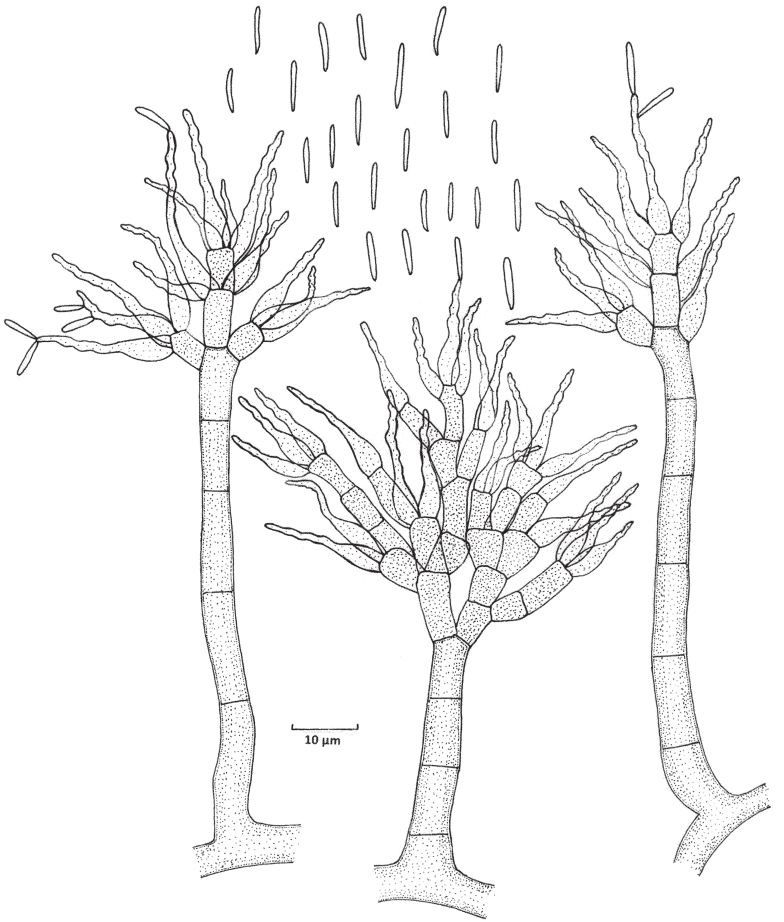

Fig. 1. *Anaselenosporella indica.*
Conidiophores, conidiogenous cells and conidia.

µm, indeterminatus, sympodialis, discretae ex ramis metuloideis, cuneiformibus, 10–14× 3–6 µm. Conidia solitaria, cylindrica, raro curvus, aseptata, utrinque rotandata, hyalina, laevia, 8–12 × 1.5 µm.

Type: India, Goa, Ponda, Bondla, on dead twig of unidentified tree, 20/08/2010, Pratibha J., **holotype:** HCIO 50176.

Etymology: *indicus* (Latin), referring to the country where the type was collected.

Anamorphic fungus. Colonies on natural substrate effuse, brown; mycelium partly superficial, partly immersed, composed of smooth, light brown, branched, septate, 2–3.5 µm wide hyphae. Colonies on PDA dark green,

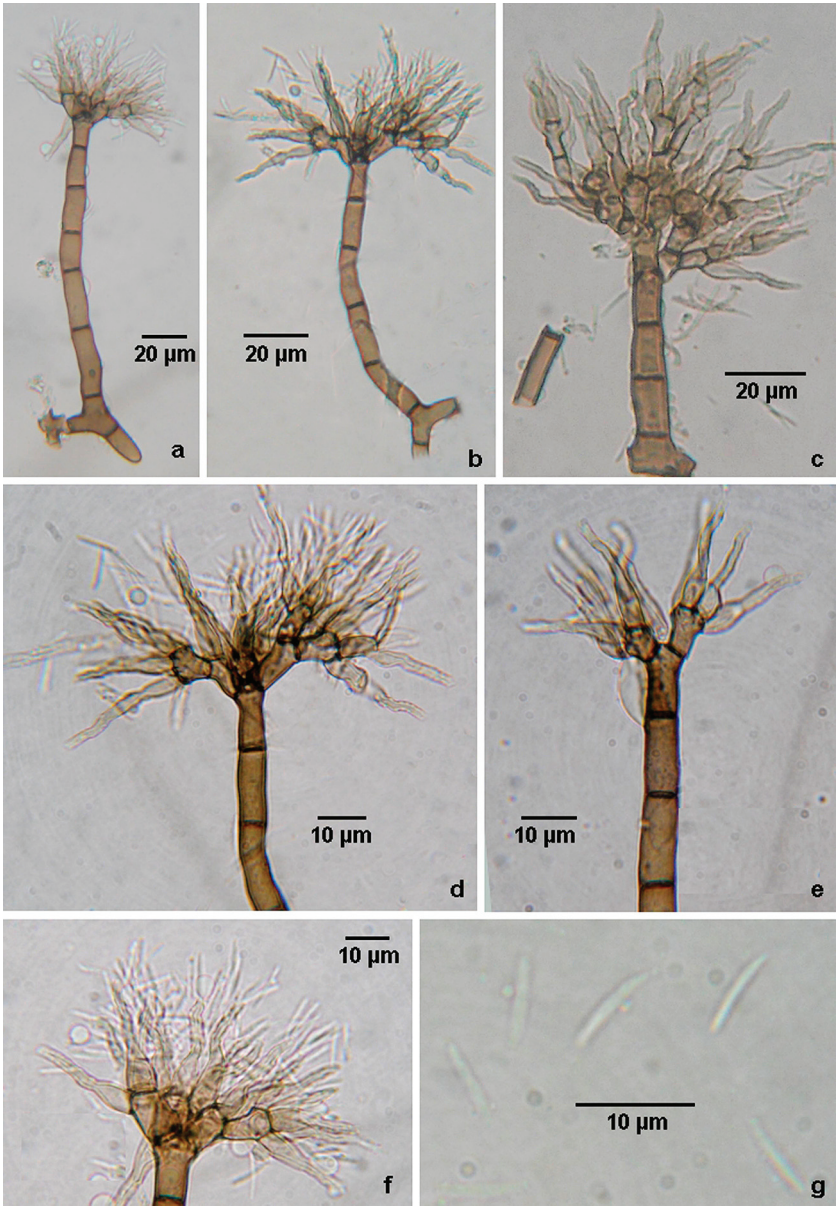

Fig. 2. *Anaselenosporella indica:* a–e. conidiophores, conidiogenous cells, and conidia; f. conidiogenous cells and conidia; g. conidia.

wooly, reverse black, margin serrated, attaining a diam. of 1.8 cm in 10 days. Conidiophores macronematous, mononematous, single, erect, smooth, straight to slightly flexuous, branched at the apex, dark brown at the base, pale brown towards the tip, multiseptate, 85–140 × 4.5–8 µm. Conidiogenous cells polyblastic, lageniform, slightly geniculate and elongated towards the apex, 15–30 × 2–4 µm, indeterminate, sympodial, discrete, formed in a compact cluster on cuneiform, dark brown, smooth, thick-walled, 10–14 × 3–6 µm metuloid branches. Conidia solitary, cylindrical, rarely curved, aseptate, rounded at both ends, hyaline, smooth, 8–12 × 1–1.5 µm.

Notes: Heredia et al. (Castañeda et al. 2010) established the monotypic genus *Anaselenosporella* with *A. sylvatica* as type species to accommodate a fungus with polyblastic, discrete, lageniform, sympodial conidiogenous cells formed on metuloid cells with acicular, filiform, fusiform to semi-circular, unicellular, hyaline conidia. *Anaselenosporella indica* differs from the type species in conidiophore and conidiogenous cell dimensions and conidiophore branching. In *A. sylvatica* the conidiophores are much larger (700–1200 × 12–28 µm) and dichotomously branched and the conidiogenous cells smaller (5–10 × 2–2.5 µm) than for *A. indica*. The type species is further differentiated by conidia that are acicular, curved to semicircular, truncate at the base, and not solitary, cylindrical, rarely curved, rounded at both ends as in the new species.

Arachnophora goanensis Pratibha, Bhat & Raghuk. **sp. nov.** Figs 3, 4

MycoBank MB561105

Ad fungos anamorphicus. Conidiophora macronemata, mononemata, apicem versus attenuata, singula, erecta, laevia, recta vel leviter flexuosa, non-ramosa, atrobrunnea ad basim, pallide brunnea ad apicem, multiseptata, 80–200 × 4.5–7 µm. Cellulae conidiogenae monoblasticae, cylindricae, terminales, integratae, determinatae vel interdum percurrentes, pallide brunneae, 5–8 × 2.5–4 µm. Conidia solitaria, blastica, acrogena, staurosporia, septata, sicca, laevia, 25–40 × 20–25 µm, cum unicus, atrobrunnea, 6–9 × 5.5–8.5 µm cellulae basali et 1-3, atrobrunneae, 3–7.5 × 5.5–8.5 µm cellulae centrales, edens ortus ad pallide brunnae cellulae laterales, ortus ad 1–4, hyalina ad pallide brunnea, 4–8 × 1–3 µm brachiis. Synanamorpha conidia hyalina, fusiformia, aseptata, 5–8 × 1 µm, in cellulae peripherales, oriunda.

Type: India, Goa, Sanguem, Netravali, on dry and decaying bark of unidentified tree, 28/09/10, Pratibha J., **holotype:** HCIO 50177.

Etymology: *goanensis* (Latin), referring to the state where the type was collected.

Anamorphic fungus. Colonies on natural substrate effuse, brown; mycelium partly superficial, partly immersed, composed of smooth, light brown, branched, septate, 2–3 µm wide hyphae. Colonies on PDA dark green, flat, reverse black, margin serrated, attaining a diam. of 1.4 cm in 10 days. Conidiophores differentiated, mononematous, tapering towards apex, single, erect, smooth, straight to slightly flexuous, unbranched, dark brown at the base,

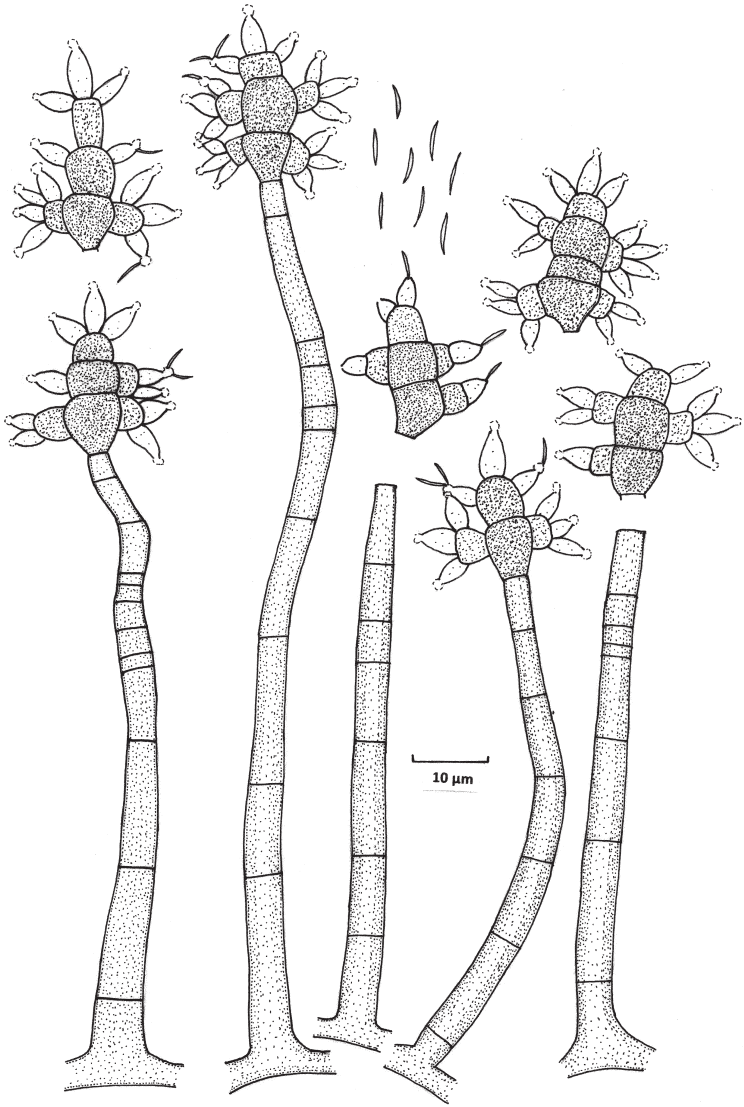

Fig. 3. *Arachnophora goanensis.*
Conidiophores, conidiogenous cells, stauroconidia, and *Selenosporella*-like synanamorph.

pale brown towards the apex, multiseptate, 80–200 × 4.5–7 µm. Conidiogenous cells monoblastic, cylindrical, terminal, integrated, determinate or sometimes percurrently proliferating, light brown, 5–8 × 2.5–4 µm. Conidia solitary,

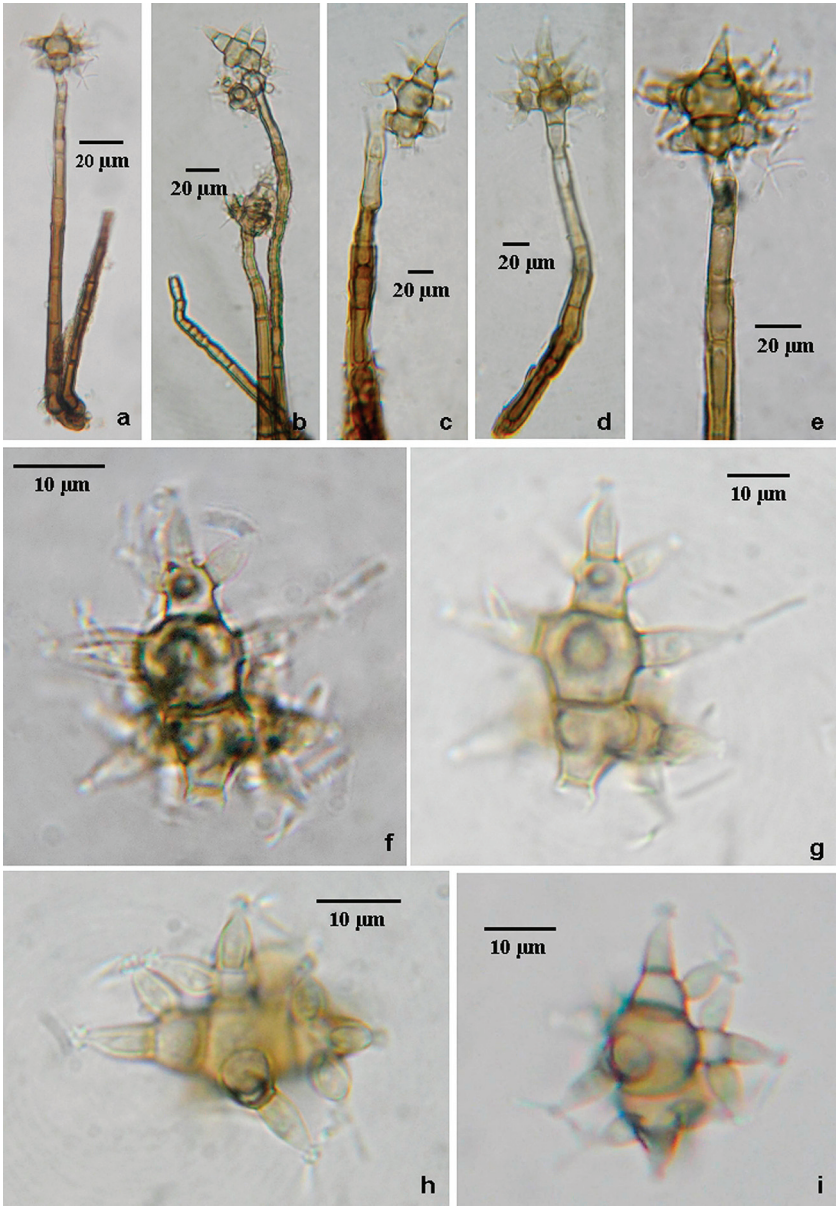

Fig. 4. *Arachnophora goanensis:* a–e. conidiophores, conidiogenous cells and conidia; f–i. stauroconidia, with *Selenosporella*-like synanamorph.

blastic, acrogenous, staurosporous, septate, dry, smooth, 25–40 × 20–25 µm, with one, dark brown, 6–9 × 5.5–8.5 µm basal cell and 1–3, dark brown, 3–7.5 × 5.5–8.5 µm central cells; each central cell either gives rise directly to 2 or more fertile, hyaline to pale brown arm-cells, or to a light brown lateral cell, which in turn gives rise to 1–4 fertile arms; fertile arms hyaline to pale brown, 4–8 × 1–3 µm, producing synanamorphic conidia at the tip. *Selenosporella*-like synanamorphic conidia hyaline, fusiform, aseptate, 5–8 × 1 µm, formed on tip of the peripheral cells of each conidial arm.

Notes: Hennebert (1963) established *Arachnophora* to accommodate a fungus having monoblastic, terminal, integrated, percurrently proliferating conidiogenous cells and staurosporous, solitary, pigmented, acrogenous conidia and with usually two central cells in the axis and several radial, recurved, conical arms that arise from the central cells. Of the eight species previously included in the genus, only six are currently accepted (Table 1): *Arachnophora crassa*, *A. excentrica* (B. Sutton) S. Hughes [≡ *Digitoramispora excentrica* (B. Sutton) R.F. Castañeda & W.B. Kendr.], *A. fagicola* (type species), *A. hughesii, A. polyradiata, A. pulneyensis, A. simplex* Ichinoe [≡ *Uberispora simplex* (Ichinoe) Piroz. & Hodges], and *A. uberisporoides* (Hennebert 1963, Pirozynski & Hodges 1973, Révay & Gönczöl 1989, Castañeda & Kendrick 1990, Castañeda et al. 1996, 1997; Castañeda & Guarro 1998).

Table 1: Synopsis of accepted species of *Arachnophora*.

Species	Conidia	*Selenosporella*-like synanamorph
A. crassa Révay & Gönczöl	2-celled central body, 16–22 × 8–9.6 µm, each cell bearing 1–2-celled lateral branches	Borne directly on the apex of lateral branches
A. fagicola Hennebert	2-celled central body, 16–20 × 10–13 µm, each cell bearing several lateral protuberances, each bearing 1 or more inwardly curved, claw- or spine-like processes	Absent
A. goanensis	2–4-celled central body, 25–40 × 20–25 µm; each central cell bearing aseptate, hyaline to pale brown arms, 4–8 × 1–3 µm, borne directly on either central cell or light brown lateral cells	Conidia blastic, hyaline, fusiform, aseptate, 5–8 × 1 µm
A. hughesii R.F. Castañeda & Guarro	2–3-celled central body, 27–30(–37) × 17–24(–30) µm, with 2–5 tapered, 0–1-septate horn-like or conical arms	Conidia blastic, fusiform, aseptate, colourless, 3–4 × 0.5–1 µm
A. polyradiata (Mercado & R.F. Castañeda) R.F. Castañeda & W. Gams	3-celled central body, 28–40 × 25–38 µm, each cell bearing 2–3-septate, radiating arms	Conidia hyaline, aseptate, 4.5–7 × 0.5–1 µm
A. pulneyensis (Subram. & Bhat) R.F. Castañeda	2–3-celled central body, 16–24 × 6.4–8.1 µm, with up to 4 arms	Absent
A. uberisporoides R.F. Castañeda	2-celled central body, 17–20 × 9–13 µm, with 4–6 dome-shaped arms	Absent

Arachnophora goanensis resembles *A. polyradiata* in conidial shape and the *Selenosporella*-like synanamorph at the tip of the arms with fusiform, hyaline, 1-celled conidia. However, it differs in conidiophore dimension and number of conidial cells and arms. The *A. polyradiata* conidiophores are shorter (≤ 50 µm long) and the conidia are composed of two dark brown central cells, with each cell giving rise to one 2–3-septate, radiating arm.

Catenosynnema micheliae Kodsueb et al. Cryptog. Mycol. 28: 239. 2007. Figs 5a, b

Anamorphic fungus. Conidiomata sporodochial, superficial, light brown. Conidiophores branched, light brown, 40–70 × 2–4 µm. Conidiogenous cells blastic, integrated, determinate, sub-hyaline. Conidia in simple to branched acropetal chains, aseptate, light brown, smooth, ellipsoidal to fusiform, 8–12 × 3–5 µm.

Specimen examined: **INDIA**. **Maharashtra**: Amboli, on dead and decaying twigs of unidentified tree, 18/08/09, Pratibha J., GUBH MT01.

Cheiromyceopsis echinulata Mercado & J. Mena, Acta Bot. Cubana 53: 2. 1988. Figs. 5c, d

Anamorphic fungus. Conidiomata sporodochial, superficial, light brown. Conidiophores macronematous, brown, 20–40 × 5–7 µm. Conidiogenous cells monoblastic, integrated, terminal, determinate. Conidia cheiroid, dark brown, 22–30 µm long, branched; branches 3–7, verrucose, septate, 15–20 x 5–7.5 µm.

Specimen examined: **INDIA**. **Karnataka**: Uttar Kannada, Kathlekan, on dry and decaying bark of unidentified tree, 17/11/09, Ashish P., GUBH MT02.

Discussion

This paper is the first report of the genera *Anaselenosporella, Catenosynnema,* and *Cheiromyceopsis* from India, and of the genus *Arachnophora* from the Western Ghats. The genus *Anaselenosporella* was monotypic, reported only from Mexico. *Catenosynnema* and *Cheiromyceopsis* are monotypic, previously reported from Cuba and Thailand, respectively. The genus *Arachnophora* is widely distributed. The collections from Western Ghats form an interesting observation.

Acknowledgments

DJB thanks the CSIR, MoEF, and UGC, New Delhi, for financial support in the form of research grants. We are indebted to Dr R.F. Castañeda-Ruiz, Instituto de Investigaciones Fundamentales en Agricultura Tropical Alejandro de Humboldt (INIFAT), Cuba for providing literature, valuable suggestions and reviewing the manuscript and to Dr Eric McKenzie, Landcare Research, New Zealand, for kindly reviewing the manuscript for Mycotaxon.

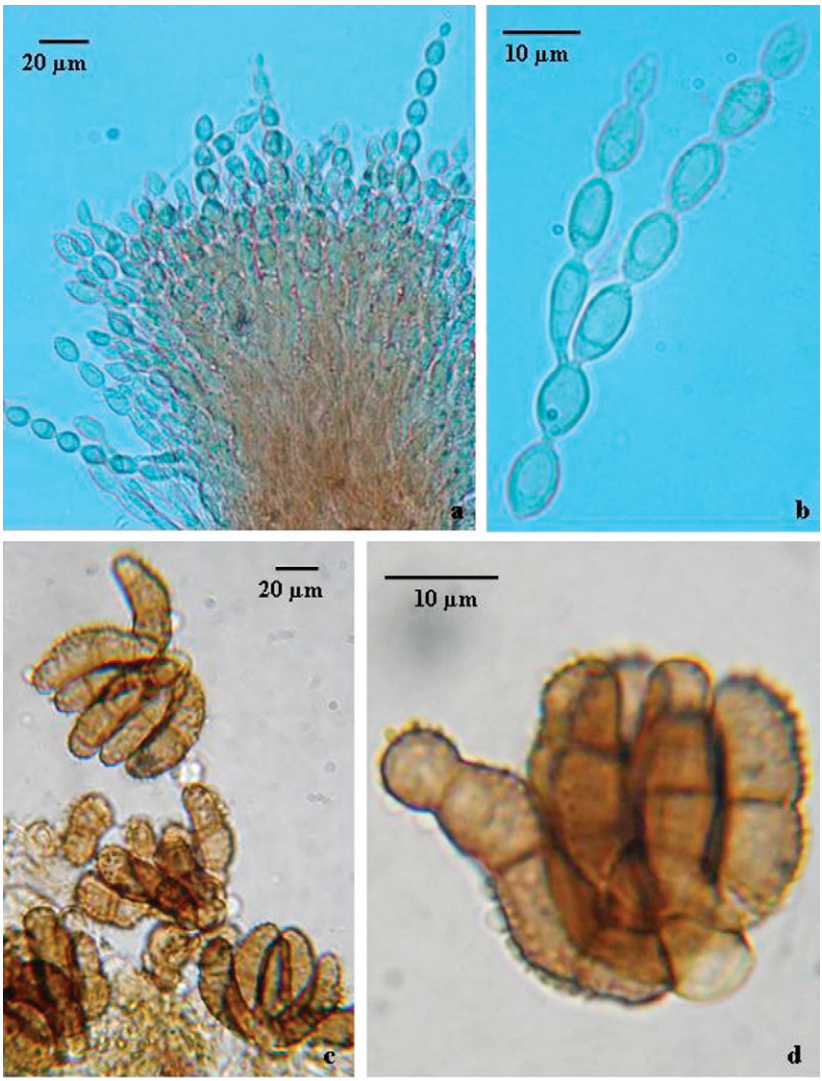

Fig. 5. a–b: Sporodochia and conidial chain of *Catenosynnema micheliae.* c–d: Cheiroid conidia of *Cheiromyceopsis echinulata.*

Literature cited

Castañeda-Ruiz RF, Guarro J. 1998. Two new hyphomycetes from rainforests of Cuba. Canadian Journal of Botany 76(9): 1584–1588. http://dx.doi.org/10.1139/cjb-76-9-1584

Castañeda-Ruiz RF, Kendrick B. 1990. Conidial fungi from Cuba: II. University of Waterloo, Biology Series 33: 1–62.

Castañeda-Ruiz RF, Guarro J, Cano J. 1996. Notes on conidial fungi. X. A new species of *Ceratosporella* and some new combinations Mycotaxon 60: 275–281.

Castañeda-Ruiz RF, Gams W, Saikawa M. 1997. Three new conidial fungi (hyphomycetes) from Cuba. Nova Hedwigia 64: 473–483.

Castañeda-Ruiz RF, Heredia AG, Arias RM, Stadler M, Saikawa M, Minter DW. 2010. *Anaselenosporella sylvatica* gen. & sp. nov. and *Pseudoacrodictys aquatica* sp. nov., two new anamorphic fungi from Mexico. Mycotaxon 112: 65–74. http://dx.doi.org/ 10.5248/112.65

Hennebert GL. 1963. Un hyphomycète nouveau, *Arachnophora fagicola* gen. nov. spec. nov. Canadian Journal of Botany 41(8): 1165–1169. http://dx.doi.org/10.1139/b63-097

Pirozynski KA, Hodges CS. 1973. New hyphomycetes from South Carolina. Canadian Journal of Botany 51(1): 151–173. http://dx.doi.org/10.1139/b73-024

Révay A, Gönczöl J. 1989. Some dematiaceous hyphomycetes from woody litter in Hungary. Nova Hedwigia, 48: 237–245.